CLAIMS

What is claimed is:

1. A method for mobile subscriber location management and for routing messages in a mobile communications network environment, the method comprising:

in a routing node:

(a) receiving signaling messages transmitted between an HLR and a VLR related to the location or subscription of a mobile subscriber;

(b) extracting mobile subscriber information from a first signaling message;

(c) caching the mobile subscriber information; and

(d) using the cached information in the processing and routing of subsequent signaling messages relating to the mobile subscriber.

2. The method of claim 1 wherein receiving signaling messages includes receiving a mobile application part (MAP) *UpdateLocation* message.

3. The method of claim 1 wherein receiving signaling messages includes receiving a mobile application part (MAP) *InsertSubscriberData* message.

4. The method of claim 1 wherein extracting information from the first message includes extracting a mobile switching center (MSC) identifier that identifies an MSC serving the mobile subscriber.

5. The method of claim 1 wherein extracting information from the first message includes extracting a visitor location register (VLR) identifier that identifies a VLR currently serving the mobile subscriber.

6. The method of claim 1 wherein extracting mobile subscriber information from the first message includes extracting mobile subscriber information provided by the mobile subscriber's home location register (HLR).

7. The method of claim 1 wherein caching the information includes storing the information in a visitor location cache (VLC).

8. The method of claim 1 wherein caching the information includes storing the information in a home location cache (HLC).

9. The method of claim 1 wherein using the cached information in the processing and routing of subsequent mobile signaling messages includes using the cached information to generate an *InsertSubscriberData* message on behalf of an HLR in response to receiving an *UpdateLocation* message.

10. The method of claim 1 wherein using the cached information in the processing and routing of subsequent mobile signaling messages includes using the cached information to generate and route a *ProvideRoamingNumber_Ack* message on behalf of a VLR in response to a received *ProvideRoamingNumber* message.

11. The method of claim 1 wherein using the cached information in the processing and routing of subsequent mobile signaling messages includes using the cached information to process and route a received *CancelLocation* message.

12. The method of claim 11 including replicating the received *CancelLocation* message to multiple VLRs.

13. The method of claim 1 wherein performing steps (a)-(d) in a routing node includes performing steps (a)-(d) in a signal transfer point.

14. The method of claim 1 wherein performing steps (a)-(d) at a network routing node includes performing steps (a)-(d) in an SS7/IP gateway.

15. A method for reducing location management message traffic in a mobile communications network, the method comprising:

(a) receiving, at a routing node, a first location update message in response to a first change in location of a mobile subscriber;

(b) forwarding the location update message to an HLR associated with the mobile subscriber;

(c) receiving a message from the HLR including subscription information regarding the mobile subscriber;

(d) caching the subscription information;

(e) receiving a second location update message in response to a second change in location of a mobile subscriber; and

(f) generating and routing a message on behalf of the HLR using the cached subscription information.

16. The method of claim 15 wherein receiving a first location update message includes intercepting a location update message addressed to the HLR.

17. The method of claim 15 wherein receiving a first location update message includes receiving a first location update message addressed to the routing node.

18. The method of claim 15 wherein forwarding the location update message to an HLR includes changing an MSC and a VLR ID in the location update message to values that correspond to the routing node.

19. The method of claim 15 wherein forwarding the location update message to an HLR includes forwarding the location update message without modifying MSC and VLR ID parameters in the location message.

20. The method of claim 15 wherein receiving a message from the HLR including subscription information includes intercepting a message addressed to a VLR.

21. The method of claim 15 wherein receiving a message from the HLR including subscription information includes receiving a message addressed to the routing node.

22. The method of claim 15 wherein receiving a second location update message includes intercepting a location update message addressed to the HLR.

23. The method of claim 15 wherein receiving a second location update message includes receiving a second location update message addressed to the routing node.

24. The method of claim 15 wherein generating a message on behalf of the HLR includes generating the message without forwarding the second location update message to the HLR.

25. The method of claim 15 comprising replicating the cached information between databases of a mated pair of routing nodes.

26. The method of claim 15 wherein generating a message on behalf of the HLR includes generating an insert subscriber data message containing mobile subscriber subscription information and routing the insert subscriber data message to a VLR currently serving the mobile subscriber.

27. The method of claim 15 comprising, in response to the second location update message, generating a cancel location message and forwarding the cancel location message to a VLR previously serving the mobile subscriber.

28. The method of claim 27 comprising, in response to the second location update message, delaying sending of a cancel location message to a previously serving VLR to account for the mobile subscriber moving back into an area of a currently serving VLR.

29. A network routing node for providing gateway location register (GLR) functionality and for routing messages in a mobile communications network, the routing node comprising:

(a) a communications module for sending and receiving signaling messages in a mobile communications network;

(b) a location register caching application operatively associated with the communications module for identifying messages transmitted between an HLR and a VLR related to the location or subscription of a mobile subscriber, extracting mobile subscriber information from a first type of identified signaling messages, and responding to a second type of identified signaling messages using the extracted information;

(c) a location register cache for temporarily storing and providing access to mobile subscriber specific information extracted from the identified signaling messages of the first type; and

(d) a routing module operatively associated with the communications module for routing response messages generated by the location register caching application to a destination.

30. The network routing node of claim 29 wherein the communications module comprises a link interface module (LIM).

31. The network routing node of claim 29 wherein the communications module is a data communications module (DCM).

32. The network routing node of claim 29 wherein the first type of identified signaling messages includes first MAP UpdateLocation messages generated in response to a first change in location of a mobile subscriber and an insert subscriber data message generated in response to the first MAP UpdateLocation messages and wherein the second type of identified messages includes MAP UpdateLocation messages generated in response to changes in location of the mobile subscriber after the first change in location.

33. The network routing node of claim 29 wherein the first type of identified signaling messages includes MAP LocationUpdate messages including mobile subscriber roaming number information and the second type of identified signaling messages includes MAP ProvideRoamingNumber messages requesting the mobile subscriber roaming number information.

34. The network routing node of claim 29 wherein the second type of signaling messages includes LocationCancel message and the location register caching application is adapted to replicate the LocationCancel messages to multiple VLRs.

35. The network routing node of claim 29 wherein the location register cache includes an HLR cache for storing information conventionally stored by an HLR and a VLR cache for storing information conventionally stored by a VLR.

36. The network routing node of claim 29 comprising a provisioning platform for synchronizing the location register cache with a location register cache in a mated routing node.